

{EPITECH}

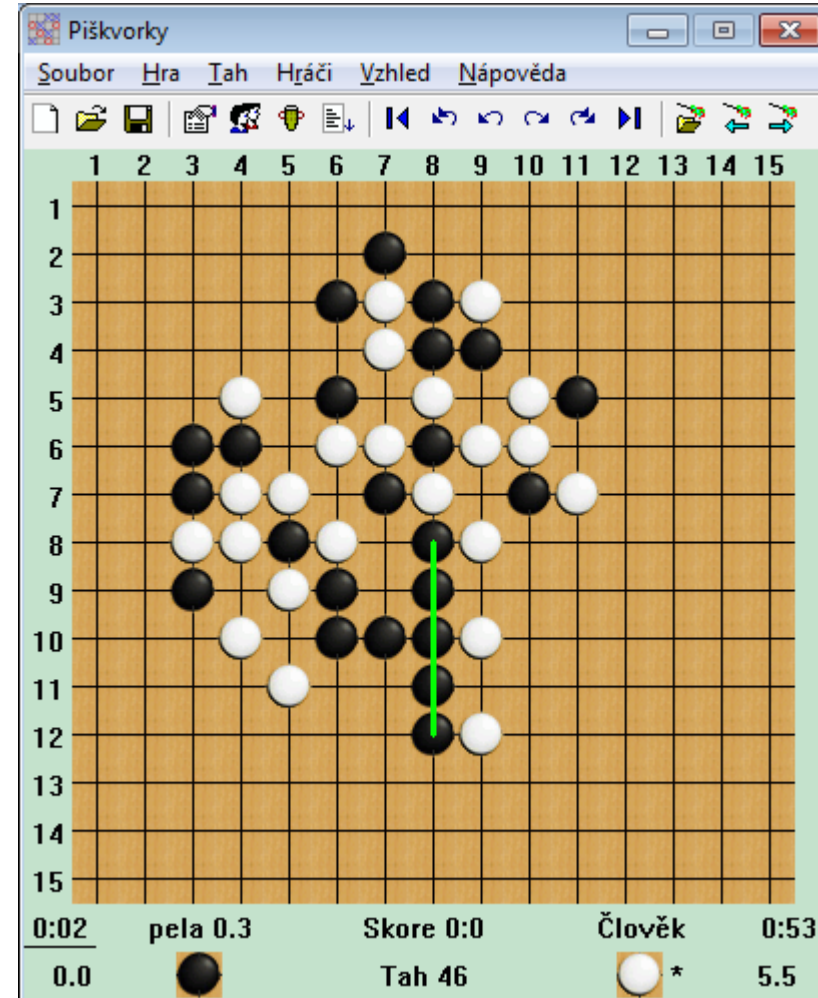
Gomoku_

<Kick-Off>

gomoku_

< What even is that thing? >

- Multiple rules, but here we use the freestyle rules
- More or less a game of connect-5
- Two AIs (named brains) fight each other
- Time and memory limits for each brain

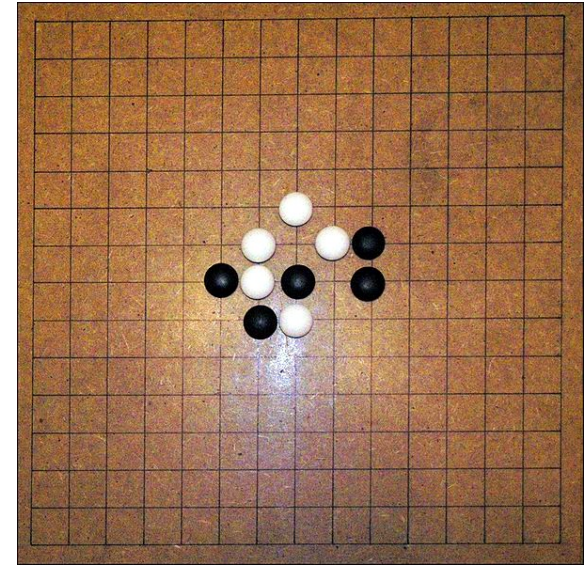


Official piskvork screenshot

Goals_

< What you need to turn in >

- A full gomoku AI that can play as well as possible
- Linux support (you can also support other platforms if you wish)
- Implements the given protocol (standard protocol for gomoku brains)
- Does not play illegal moves
- Plays within the given time limits

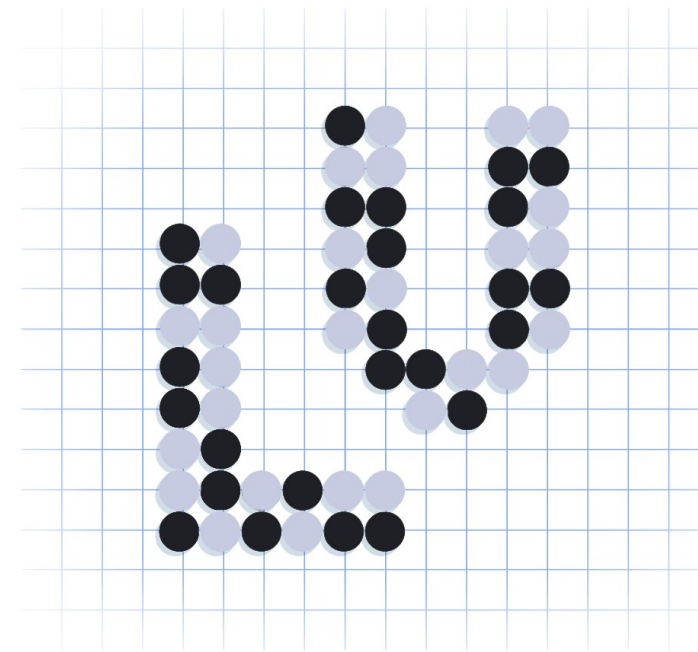


Gomoku game with the Renju rules being played

liskvork_

< Running brains >

- Brain runner for gomoku
- Cross-platform
- Complete game configurations
- Fully Free and Open Source
- Maintained by Epitech staff
- Replacement for Piskvork

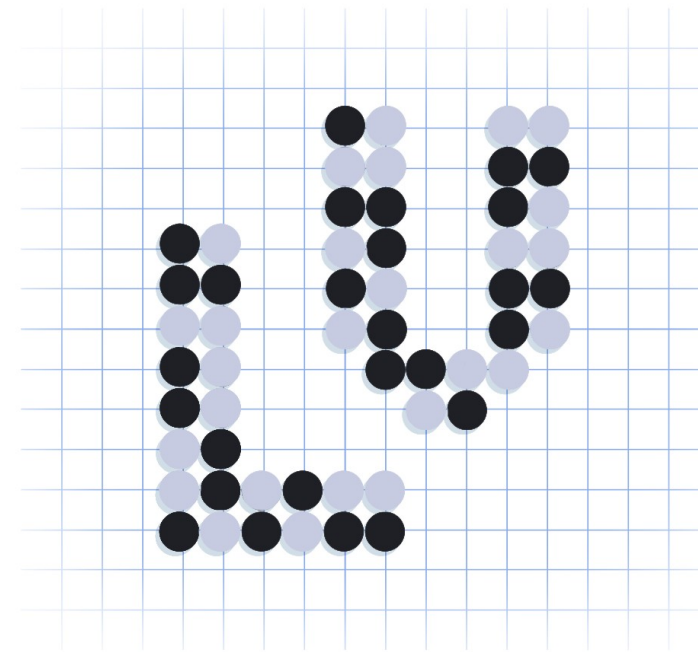


liskvork logo

liskvork_

< Main links >

- Main website: <https://liskvork.org>
- Downloads: <https://releases.liskvork.org>
- Source code: <https://sr.ht/~emneo/liskvork>



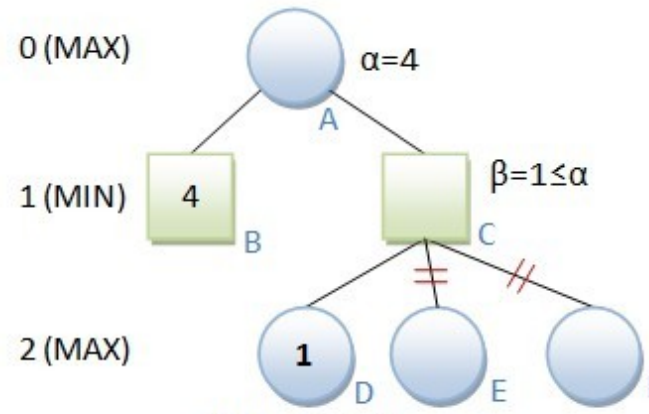
liskvork logo

Take a decision_

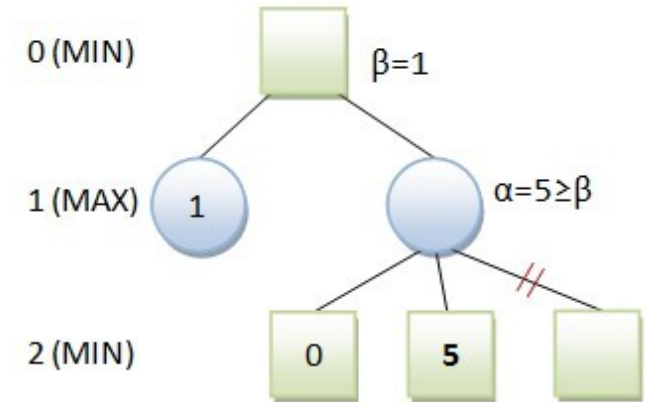
< How do I make my AI think? >

- Min-Max
- Alpha-Beta
- Pruning techniques (can be associated to Alpha-Beta)

Those are the classical ways to make an AI for games like gomoku. It's also used in chess and traditional go!



Min-Max with Alpha-Beta pruning



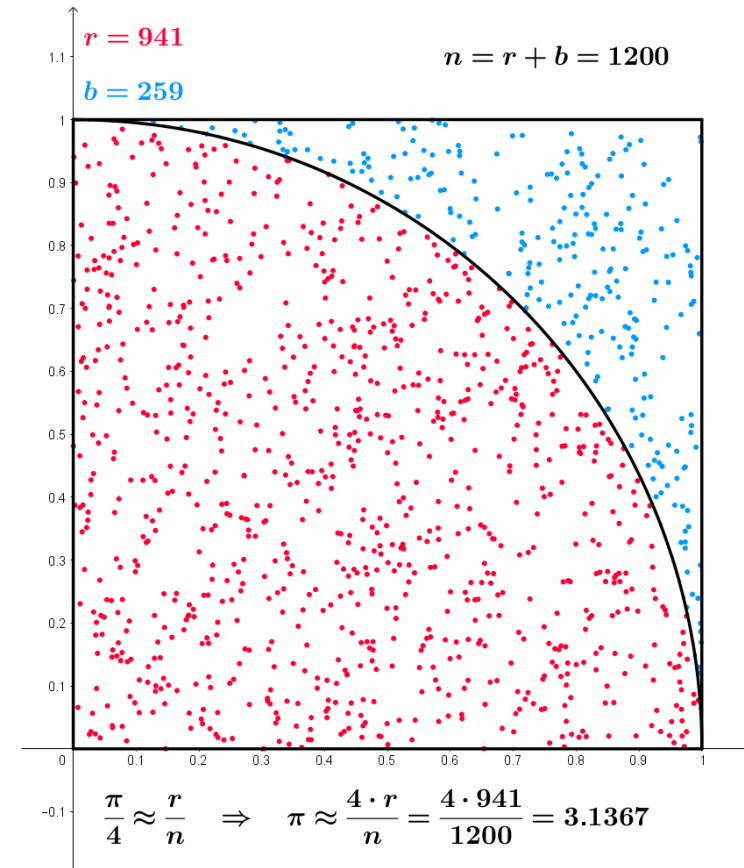
Beta Cut-off

Take a decision_

< Other ways to take decisions? >

- Monte-Carlo
- Uniform sets
- The law of large numbers
- Distributions

While not as used as the other methods
they can be very good too. Do not
underestimate them!



Pi approximation using the Monte-Carlo method

Take a decision_

< What about machine learning? >

There really is only one way to use machine learning in gomoku AIs

NNUEs (Efficiently Updatable Neural Network)

Used on almost every well performing gomoku and chess AIs. It serves as a simple and fast model to give a score to a position



Rapfi (the current WR holder AI for gomoku) uses NNUEs

Warning: It is fairly hard to implement and train an NNUE properly, so choose to use this wisely...

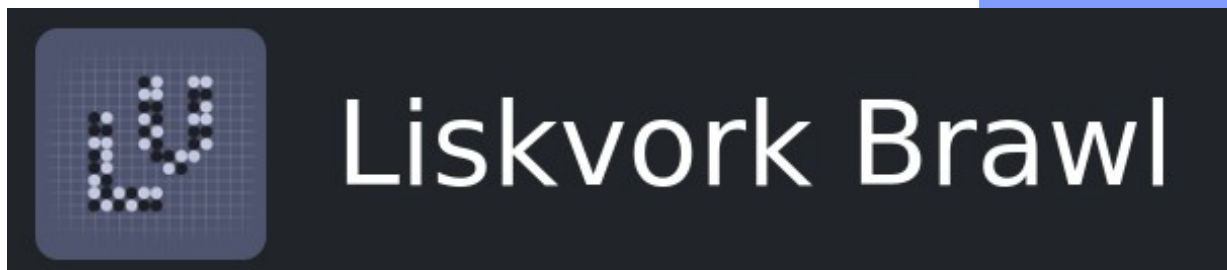
Fight_

< What about a tournament? >

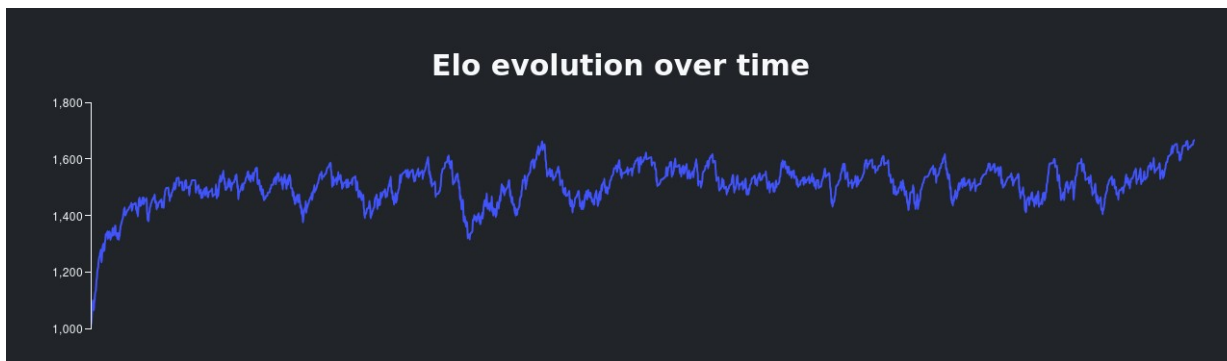
There will be a tournament happening during the project's duration.

<https://gomoku.epitest.eu>

- Opt-in (check the subject to know how to enroll)
- Constant (Works with waves of fights)
- Elo system with game list
- Replay system
- Complete documented public API
- More features and updates to come



The tournament logo



Elo over time with 4600 games

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Gomoku_

<Kick-Off/>